

**Practice: 410 - Grade Stabilization Structure****Scenario: #1 - Embankment, Galvanized CMP or Plastic Pipe, Ratio of Earthwork (CY) to Pipe (DIFT) is greater than****Scenario Description:**

An earthen embankment dam with a galvanized corrugated steel or plastic principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is greater than 4.0. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 4,000 cubic yards and a 8" diameter 100 ft long principal spillway barrel (800 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure: Embankment Volume****Scenario Unit:** Cubic Yard**Scenario Typical Size:** 4,000**Scenario Cost:** \$11,138.27**Scenario Cost/Unit:** \$2.78**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	67	\$7,087.26
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	16	\$289.76
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	69	\$1,629.09
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	54	\$186.30
Pipe, CMP, 8", 16 Gauge	1267	8" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Foot	\$7.13	100	\$713.00
Cattle Panel	1409	Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only.	Each	\$20.70	3	\$62.10
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	7	\$167.51

**Mobilization**

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57

**Practice: 410 - Grade Stabilization Structure****Scenario: #2 - Embankment, Galvanized CMP or Plastic Pipe, Ratio of Earthwork (CY) to Pipe (DIFT) is 4.0 to 2.1****Scenario Description:**

An earthen embankment dam with a galvanized corrugated steel or plastic principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 4.0 to 2.1. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 4,000 cubic yards and a 12" diameter 110 ft long principal spillway barrel (1320 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Embankment Volume**Scenario Unit:** Cubic Yard**Scenario Typical Size:** 4,000**Scenario Cost:** \$11,745.27**Scenario Cost/Unit:** \$2.94**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	67	\$7,087.26
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	16	\$289.76
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	69	\$1,629.09
<b>Materials</b>						
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	54	\$186.30
Cattle Panel	1409	Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only.	Each	\$20.70	3	\$62.10
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	7	\$167.51
Pipe, CMP, 18-16 gauge, weight priced	1322	18 & 16 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$1.20	1100	\$1,320.00
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
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**Practice: 410 - Grade Stabilization Structure****Scenario: #3 - Embankment, Galvanized CMP or Plastic Pipe, Ratio of Earthwork (CY) to Pipe (DIFT) is 2.0 to 1.4****Scenario Description:**

An earthen embankment dam with a galvanized corrugated steel or plastic principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 2.0 to 1.4. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 3,500 cubic yards and a 18" diameter 120 ft long principal spillway barrel (2160 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Embankment Volume**Scenario Unit:** Cubic Yard**Scenario Typical Size:** 3,500**Scenario Cost:** \$11,541.50**Scenario Cost/Unit:** \$3.30**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	58	\$6,135.24
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	60	\$1,416.60
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	20	\$362.20
<b>Materials</b>						
Pipe, CMP, 18-16 gauge, weight priced	1322	18 & 16 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$1.20	1800	\$2,160.00
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	7	\$167.51
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	62	\$213.90
Cattle Panel	1409	Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only.	Each	\$20.70	4	\$82.80
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28

**Mobilization**

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57

**Practice: 410 - Grade Stabilization Structure****Scenario: #4 - Embankment, Galvanized CMP or Plastic Pipe, Ratio of Earthwork (CY) to Pipe (DIFT) is 1.3 to 1.1****Scenario Description:**

An earthen embankment dam with a galvanized corrugated steel or plastic principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 1.3 to 1.1. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 3,750 cubic yards and a 24" diameter 130 ft long principal spillway barrel (3120 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Embankment Volume**Scenario Unit:** Cubic Yard**Scenario Typical Size:** 3,750**Scenario Cost:** \$13,171.92**Scenario Cost/Unit:** \$3.51**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	63	\$6,664.14
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	20	\$362.20
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	65	\$1,534.65
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	62	\$213.90
Pipe, CMP, 18-16 gauge, weight priced	1322	18 & 16 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$1.20	2470	\$2,964.00
Cattle Panel	1409	Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only.	Each	\$20.70	4	\$82.80
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	14.5	\$346.99

**Mobilization**

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57



**Practice: 410 - Grade Stabilization Structure****Scenario: #5 - Embankment, Galvanized CMP or Plastic Pipe, Ratio of Earthwork (CY) to Pipe (DIFT) is 1.0 to 0.71****Scenario Description:**

An earthen embankment dam with a galvanized corrugated steel or plastic principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 1.0 to 0.71. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 3,750 cubic yards and a principal spillway with a 30" diameter 130 ft long barrel and 60" diameter 4.5 ft tall riser (4170 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Principal Spillway Pipe Material**Scenario Unit:** Diameter Inch Foot**Scenario Typical Size:** 4,170**Scenario Cost:** \$14,652.38**Scenario Cost/Unit:** \$3.51**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$99.18	3	\$297.54
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	63	\$6,664.14
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	30	\$543.30
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	65	\$1,534.65
<b>Materials</b>						
Pipe, CMP, 14-12 gauge, weight priced	1589	14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$0.76	364.5	\$277.02
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	70	\$241.50
Pipe, CMP, 18-16 gauge, weight priced	1322	18 & 16 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$1.20	3120	\$3,744.00

**Materials**

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	14.5	\$346.99
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**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40

**Practice: 410 - Grade Stabilization Structure****Scenario: #6 - Embankment, Galvanized CMP or Plastic Pipe, Ratio of Earthwork (CY) to Pipe (DIFT) is 0.70 to 0.41****Scenario Description:**

An earthen embankment dam with a galvanized corrugated steel or plastic principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 0.70 to 0.41. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 3,500 cubic yards and a principal spillway with a 42" diameter 130 ft long barrel and 84" diameter 5.5 ft tall riser (5922 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure: Principal Spillway Pipe Material****Scenario Unit: Diameter Inch Foot****Scenario Typical Size: 5,922****Scenario Cost: \$16,774.59****Scenario Cost/Unit: \$2.83****Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$99.18	7	\$694.26
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	58	\$6,135.24
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	60	\$1,416.60
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	36	\$651.96
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	33.3	\$796.87
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	110	\$379.50
Pipe, CMP, 14-12 gauge, weight priced	1589	14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$0.76	517	\$392.92

**Materials**

Pipe, CMP, 18-16 gauge, weight priced	1322	18 & 16 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$1.20	4420	\$5,304.00
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**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57

**Practice: 410 - Grade Stabilization Structure****Scenario: #7 - Embankment, Galvanized CMP or Plastic Pipe, Ratio of Earthwork (CY) to Pipe (DIFT) is 0.40 to 0.20****Scenario Description:**

An earthen embankment dam with a galvanized corrugated steel or plastic principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 0.40 to 0.20. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards and a principal spillway with a 54" diameter 130 ft long barrel and a 108" diameter 6.5 ft tall riser (7722 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Principal Spillway Pipe Material**Scenario Unit:** Diameter Inch Foot**Scenario Typical Size:** 7,722**Scenario Cost:** \$17,113.31**Scenario Cost/Unit:** \$2.22**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	42	\$4,442.76
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$99.18	13.6	\$1,348.85
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	40	\$724.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	44	\$1,038.84
<b>Materials</b>						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	53.3	\$1,275.47
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.43	\$10.43
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	126	\$434.70
Pipe, CMP, 14-12 gauge, weight priced	1589	14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$0.76	9002.5	\$6,841.90
<b>Mobilization</b>						

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57

**Practice: 410 - Grade Stabilization Structure****Scenario: #8 - Embankment, Galvanized CMP or Plastic Pipe, Ratio of Earthwork (CY) to Pipe (DIFT) is less than 0.20****Scenario Description:**

An earthen embankment dam with a galvanized corrugated steel or plastic principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is less than 0.20. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 1,500 cubic yards and a principal spillway with a 54" diameter 130 ft long barrel and a 108" diameter 6.5 ft tall riser (7722 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure: Principal Spillway Pipe Material****Scenario Unit: Diameter Inch Foot****Scenario Typical Size: 7,722****Scenario Cost: \$14,913.68****Scenario Cost/Unit: \$1.93****Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	25	\$2,644.50
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$99.18	13.6	\$1,348.85
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	40	\$724.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	27	\$637.47
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.43	\$10.43
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	53.3	\$1,275.47
Pipe, CMP, 14-12 gauge, weight priced	1589	14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$0.76	9002.5	\$6,841.90
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	126	\$434.70
<b>Mobilization</b>						

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40



**Practice: 410 - Grade Stabilization Structure****Scenario: #9 - Embankment, Welded Steel Pipe, Aluminized CMP, or Aluminum CMP, Ratio of Earthwork (CY) to Pipe (DIFT) is greater than 4.0****Scenario Description:**

An earthen embankment dam with a smooth steel, corrugated aluminized, or corrugated aluminum principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is greater than 4.0. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 4,000 cubic yards and a 8" diameter 100 ft long principal spillway barrel (800 Diameter-inch-foot). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure: Embankment Volume****Scenario Unit: Cubic Yard****Scenario Typical Size: 4,000****Scenario Cost: \$11,636.69****Scenario Cost/Unit: \$2.91****Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	67	\$7,087.26
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	69	\$1,629.09
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$25.07	6	\$150.42
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	16	\$289.76
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	7	\$167.51
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	54	\$186.30
Cattle Panel	1409	Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only.	Each	\$20.70	3	\$62.10
Pipe, Steel, 8", Std Wt, USED	1354	Materials: - USED - 8" - Steel Std Wt	Foot	\$10.61	100	\$1,061.00

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40

**Practice: 410 - Grade Stabilization Structure**

**Scenario: #10 - Embankment, Welded Steel Pipe, Aluminized CMP, or Aluminum CMP, Ratio of Earthwork (CY) to Pipe (DIFT) is 4.0 to 2.1**

**Scenario Description:**

An earthen embankment dam with a smooth steel, corrugated aluminized, or corrugated aluminum principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 4.0 to 2.1. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 4,000 cubic yards and a 12" diameter 110 ft long principal spillway barrel (1320 Diameter-inch-foot). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Embankment Volume

**Scenario Unit:** Cubic Yard

**Scenario Typical Size:** 4,000

**Scenario Cost:** \$12,915.39

**Scenario Cost/Unit:** \$3.23

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	67	\$7,087.26
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	16	\$289.76
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	69	\$1,629.09
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$25.07	6	\$150.42
<b>Materials</b>						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	7	\$167.51
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	54	\$186.30
Cattle Panel	1409	Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only.	Each	\$20.70	3	\$62.10
Pipe, Steel, 12", Std Wt, USED	1356	Materials: - USED - 12" - Steel Std Wt	Foot	\$21.27	110	\$2,339.70

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40

**Practice: 410 - Grade Stabilization Structure**

**Scenario: #11 - Embankment, Welded Steel Pipe, Aluminized CMP, or Aluminum CMP, Ratio of Earthwork (CY) to Pipe (DIFT) is 2.0 to 1.4**

**Scenario Description:**

An earthen embankment dam with a smooth steel, corrugated aluminized, or corrugated aluminum principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 2.0 to 1.4. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 3,500 cubic yards and a 18" diameter 120 ft long principal spillway barrel (2160 Diameter-inch-foot). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Embankment Volume

**Scenario Unit:** Cubic Yard

**Scenario Typical Size:** 3,500

**Scenario Cost:** \$13,602.64

**Scenario Cost/Unit:** \$3.89

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	58	\$6,135.24
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	60	\$1,416.60
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	12	\$217.32
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$25.07	6	\$150.42
<b>Materials</b>						
Pipe, Steel, 18", Std Wt, USED	1358	Materials: - USED - 16" - Steel Std Wt	Foot	\$35.13	120	\$4,215.60
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	62	\$213.90
Cattle Panel	1409	Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only.	Each	\$20.70	4	\$82.80
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	7	\$167.51
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57

**Practice: 410 - Grade Stabilization Structure**

**Scenario: #12 - Embankment, Welded Steel Pipe, Aluminized CMP, or Aluminum CMP, Ratio of Earthwork (CY) to Pipe (DIFT) is 1.3 to 1.1**

**Scenario Description:**

An earthen embankment dam with a smooth steel, corrugated aluminized, or corrugated aluminum principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 1.3 to 1.1. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 3,750 cubic yards and a 24" diameter 130 ft long principal spillway barrel (3120 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Embankment Volume

**Scenario Unit:** Cubic Yard

**Scenario Typical Size:** 3,750

**Scenario Cost:** \$16,444.36

**Scenario Cost/Unit:** \$4.39

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	63	\$6,664.14
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	65	\$1,534.65
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$25.07	6	\$150.42
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	12	\$217.32
<b>Materials</b>						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	14.5	\$346.99
Cattle Panel	1409	Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only.	Each	\$20.70	4	\$82.80
Pipe, Steel, 24", Std Wt, USED	1360	Materials: - USED - 24" - Steel Std Wt	Foot	\$47.93	130	\$6,230.90
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	62	\$213.90

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40



**Practice: 410 - Grade Stabilization Structure**

**Scenario: #13 - Embankment, Welded Steel Pipe, Aluminized CMP, or Aluminum CMP, Ratio of Earthwork (CY) to Pipe (DIFT) is 1.0 to 0.71**

**Scenario Description:**

An earthen embankment dam with a smooth steel, corrugated aluminized, or corrugated aluminum principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 1.0 to 0.71. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,000 cubic yards and a principal spillway with a 24" diameter 90 ft long barrel and 42" diameter 6 ft tall riser (2412 diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Principal Spillway Pipe Material

**Scenario Unit:** Diameter Inch Foot

**Scenario Typical Size:** 2,412

**Scenario Cost:** \$11,616.06

**Scenario Cost/Unit:** \$4.82

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	33	\$3,490.74
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$99.18	3	\$297.54
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	35	\$826.35
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	10	\$181.10
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$25.07	10	\$250.70
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28
Pipe, Steel, 42", Std Wt, USED	1363	Materials: - USED - 42" - Steel Std Wt	Foot	\$110.70	6	\$664.20

**Materials**

Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	70	\$241.50
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	14.5	\$346.99
Pipe, Steel, 24", Std Wt, USED	1360	Materials: - USED - 24" - Steel Std Wt	Foot	\$47.93	90	\$4,313.70

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40

**Practice: 410 - Grade Stabilization Structure**

**Scenario: #14 - Embankment, Welded Steel Pipe, Aluminized CMP, or Aluminum CMP, Ratio of Earthwork (CY) to Pipe (DIFT) is 0.70 to 0.41**

**Scenario Description:**

An earthen embankment dam with a smooth steel, corrugated aluminized, or corrugated aluminum principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 0.70 to 0.41. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 1,500 cubic yards and a principal spillway with a 30" diameter 90 ft long barrel and 42" diameter 4.5 ft tall riser (2889 Diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Principal Spillway Pipe Material

**Scenario Unit:** Diameter Inch Foot

**Scenario Typical Size:** 2,889

**Scenario Cost:** \$12,991.35

**Scenario Cost/Unit:** \$4.50

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	25	\$2,644.50
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$99.18	3	\$297.54
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$25.07	10	\$250.70
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	16	\$289.76
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	27	\$637.47
<b>Materials</b>						
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	70	\$241.50
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28

**Materials**

Pipe, Steel, 30", Std Wt, USED	1361	Materials: - USED - 30" - Steel Std Wt	Foot	\$75.35	90	\$6,781.50
Pipe, Steel, 42", Std Wt, USED	1363	Materials: - USED - 42" - Steel Std Wt	Foot	\$110.70	4.5	\$498.15
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	14.5	\$346.99

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40

**Practice: 410 - Grade Stabilization Structure**

**Scenario: #15 - Embankment, Welded Steel Pipe, Aluminized CMP, or Aluminum CMP, Ratio of Earthwork (CY) to Pipe (DIFT) is 0.40 or less**

**Scenario Description:**

An earthen embankment dam with a smooth steel, corrugated aluminized, or corrugated aluminum principal spillway with a ratio of earthwork (CY) to pipe (DIFT) that is 0.40 or less. Installed to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water requires structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 750 cubic yards and a principal spillway with a 24" diameter 90 ft long barrel and 42" diameter 6 ft tall riser (2412 diameter-inch-feet). Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Principal Spillway Pipe Material

**Scenario Unit:** Diameter Inch Foot

**Scenario Typical Size:** 2,412

**Scenario Cost:** \$8,963.57

**Scenario Cost/Unit:** \$3.72

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$99.18	3	\$297.54
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acre	\$267.70	1	\$267.70
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	2	\$95.30
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	12.5	\$1,322.25
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$25.07	10	\$250.70
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	10	\$181.10
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	14.5	\$342.35
<b>Materials</b>						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	14.5	\$346.99
Structural steel tubing, 2" diameter	1120	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	\$3.45	70	\$241.50
Pipe, Steel, 24", Std Wt, USED	1360	Materials: - USED - 24" - Steel Std Wt	Foot	\$47.93	90	\$4,313.70

**Materials**

Pipe, Steel, 42", Std Wt, USED	1363	Materials: - USED - 42" - Steel Std Wt	Foot	\$110.70	6	\$664.20
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	0.3	\$7.28

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40

**Practice: 410 - Grade Stabilization Structure****Scenario: #16 - Drop\_Structure, Rock****Scenario Description:**

A Straight Drop structure constructed of rock riprap held in place by galvanized wire, such as, gabion baskets, fence panels, or (sausage) baskets. These structures are used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a gabion wall structure with a drop of 3ft and weir length of 8ft (24 square feet). The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (ie: outlet apron elevation). The unit of payment measurement is defined as the volume of rock riprap installed in the gabions in (cubic yards). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Volume of Rock**Scenario Unit:** Cubic Yard**Scenario Typical Size:** 16**Scenario Cost:** \$4,203.71**Scenario Cost/Unit:** \$262.73**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.73	40	\$149.20
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$97.05	5	\$485.25
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$2.00	7	\$14.00
<b>Labor</b>						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$37.95	16	\$607.20
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	5	\$118.05
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	16	\$289.76
<b>Materials</b>						
Geotextile, non-woven, heavy weight	1210	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	\$4.01	23	\$92.23
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$23.53	5	\$117.65
Gabion basket or mat	1378	Gabion baskets or mats installed and filled on grade, includes materials, transport, equipment, and labor, does not include geotextile fabric.	Cubic Yard	\$132.05	16	\$2,112.80

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57
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**Practice: 410 - Grade Stabilization Structure****Scenario: #17 - Chute, Rock****Scenario Description:**

A sloping drop structure constructed of loose rock riprap. This kind of structure is generally used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a chute having a 20 foot bottom width with 4:1 side slopes, a chute depth of 1.75 feet, a drop height of 10 feet on a 4:1 slope and a rock thickness of 24 inches. The unit of payment measurement is defined as the volume of rock riprap installed in "cubic yards". The drop is defined as the inlet crest elevation minus the control outlet elevation. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure: Cubic Yards of Rock Riprap Installed****Scenario Unit:** Cubic Yard**Scenario Typical Size:** 237**Scenario Cost:** \$14,103.01**Scenario Cost/Unit:** \$59.51**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	10	\$1,057.80
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$97.05	10	\$970.50
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	20	\$472.20
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	8	\$144.88
<b>Materials</b>						
Geotextile, non-woven, heavy weight	1210	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	\$4.01	425	\$1,704.25
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$23.53	379.2	\$8,922.58
<b>Mobilization</b>						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	2	\$830.80

**Practice: 410 - Grade Stabilization Structure****Scenario: #18 - Chute, Rock with Concrete Cutoff****Scenario Description:**

A sloping drop structure constructed of loose rock riprap with a concrete upstream cutoff wall. This kind of structure is generally used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a chute having a 20 foot bottom width with 4:1 side slopes, a chute depth of 1.75 feet, a drop height of 10 feet on a 4:1 slope and a rock thickness of 24 inches. The unit of payment measurement is defined as the volume of rock riprap installed in "cubic yards". The drop is defined as the inlet crest elevation minus the control outlet elevation. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Cubic Yards of Rock Riprap Installed

**Scenario Unit:** Cubic Yard

**Scenario Typical Size:** 237

**Scenario Cost:** \$17,456.17

**Scenario Cost/Unit:** \$73.65

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	10	\$1,057.80
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$97.05	10	\$970.50
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$313.38	10.7	\$3,353.17
<b>Labor</b>						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	20	\$472.20
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	8	\$144.88
<b>Materials</b>						
Geotextile, non-woven, heavy weight	1210	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	\$4.01	425	\$1,704.25
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$23.53	379.2	\$8,922.58
<b>Mobilization</b>						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	2	\$830.80

**Practice: 410 - Grade Stabilization Structure****Scenario: #19 - Chute, Concrete****Scenario Description:**

A sloping drop structure constructed of cast-in-place concrete. This kind of structure is generally used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a chute having a 20 foot bottom width with 2:1 side slopes, a chute depth of 3.0 feet, and a drop height of 10 feet on a 2.5:1 slope. The unit of payment measurement is defined as the volume of concrete installed in "cubic yards". The drop is defined as the inlet crest elevation minus the control outlet elevation. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure: Cubic Yards of Concrete Installed****Scenario Unit:** Cubic Yard**Scenario Typical Size:** 40**Scenario Cost:** \$21,532.83**Scenario Cost/Unit:** \$538.32**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$105.78	32	\$3,384.96
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$313.38	40	\$12,535.20
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	8	\$381.20
<b>Labor</b>						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$37.95	64	\$2,428.80
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	32	\$579.52
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	40	\$944.40
<b>Materials</b>						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	8.4	\$201.01
Pipe, PVC, 4", SCH 80	1347	Materials: - 4" - PVC - SCH 80 - ASTM D1785	Foot	\$4.47	99.5	\$444.77
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
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**Practice: 410 - Grade Stabilization Structure****Scenario: #20 - Chute, Gabion Mattress****Scenario Description:**

A sloping drop structure constructed of gabion mattresses. This kind of structure is generally used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a chute having 8 - 6'x9'x9" gabion mattresses, 8 - 6'x12'x9" gabion mattresses, 28 cubic yards of rock, 12.4 cubic yards of filter material, and 112 square yards of geotextile. The unit of payment measurement is defined as the volume of rock installed in the mattresses in "cubic yards". The drop is defined as the inlet crest elevation minus the control outlet elevation. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure: Volume of Rock****Scenario Unit: Cubic Yard****Scenario Typical Size: 28****Scenario Cost: \$11,777.10****Scenario Cost/Unit: \$420.61****Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$47.65	16	\$762.40
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$158.64	24	\$3,807.36
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	32	\$579.52
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	40	\$944.40
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$37.95	16	\$607.20
<b>Materials</b>						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	12.4	\$296.73
Geotextile, non-woven, heavy weight	1210	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	\$4.01	112	\$449.12
Gabion basket or mat	1378	Gabion baskets or mats installed and filled on grade, includes materials, transport, equipment, and labor, does not include geotextile fabric.	Cubic Yard	\$132.05	28	\$3,697.40
<b>Mobilization</b>						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	1	\$217.57

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
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**Practice: 410 - Grade Stabilization Structure****Scenario: #21 - Drop\_Structure, Metal****Scenario Description:**

A Straight, semicircular, or Box Drop structure composed of metal and used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a semicircular steel toe wall structure with a drop of 3ft and total weir length of 30 ft (13.4 feet in diameter with 4.5 foot sidewall extensions) and 11.3 foot long by 5.4 foot high headwalls. The unit of payment measurement is defined as the area of metal used to construct the headwalls and semicircular weir. Example:  $30 \times 3$  (weir length \* drop) +  $2 \times (11.3 \times 5.4)$  (two headwalls) = 212.04 (round to nearest foot). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure:** Total Area of Metal Walls and Weir

**Scenario Unit:** Square Foot

**Scenario Typical Size:** 212

**Scenario Cost:** \$7,181.95

**Scenario Cost/Unit:** \$33.88

**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$313.38	9	\$2,820.42
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.73	75	\$279.75
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$97.05	8	\$776.40
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	30	\$543.30
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	8	\$188.88
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$25.07	10	\$250.70
<b>Materials</b>						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.25	3	\$72.75
Pipe, CMP, 12", 14 Gauge	1377	12" - Corrugated Steel Pipe. Galvanized, uncoated. 14 Gauge. Materials only.	Foot	\$9.39	2	\$18.78

**Materials**

Corrugated Steel, 12 Gauge, galvanized	1376	Corrugated Steel, 12 gauge, 3" by 1" corrugations, galvanized, meets ASTM A 929. Materials only.	Square Foot	\$7.25	212	\$1,537.00
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$23.53	11	\$258.83

**Mobilization**

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$217.57	2	\$435.14
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**Practice: 410 - Grade Stabilization Structure****Scenario: #23 - Drop\_Structure, Concrete****Scenario Description:**

A Straight, semicircular, or Box Drop structure composed of reinforced concrete used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a wall structure with a drop of 4 ft and weir length of 6 ft wide and is 6 ft deep with 3 ft above the crest. The unit of payment measurement is defined as cubic yards of concrete. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Scenario Feature Measure: Cubic Yards of Concrete****Scenario Unit: Cubic Yard****Scenario Typical Size: 12****Scenario Cost: \$10,859.33****Scenario Cost/Unit: \$904.94****Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
<b>Equipment/Installation</b>						
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-place in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$313.38	11.6	\$3,635.21
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.73	500	\$1,865.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$97.05	20	\$1,941.00
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$25.07	24	\$601.68
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.11	48	\$869.28
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$23.61	20	\$472.20
<b>Materials</b>						
Geotextile, non-woven, heavy weight	1210	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	\$4.01	69	\$276.69
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$23.53	29	\$682.37
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.93	4.2	\$100.51
<b>Mobilization</b>						

**Mobilization**

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$415.40	1	\$415.40
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